HONEY BADGER PROJECT
Project File Document W-034
Fisher Habitat Analysis
October 6, 2021

Habitat Relationships

Fishers are forest carnivores that occur at low population densities, occurring most commonly in landscapes associated with late-successional forests; especially in riparian areas (Powell and Zielinski 1994). They avoid open areas and select for areas with dense canopy cover (Raley et al. 2012), and mature forest arranged in contiguous, complex shapes (Sauder and Rachlow 2014). Fisher distribution in the western United States is consistently associated with low to mid-elevation forests (Zielinski et al. 2010, Spencer et al. 2011). Fisher habitat in the Rocky Mountains generally consists of mature and old-growth conifer forests in summer and young, mature and old-growth forests in winter (Heinemeyer and Jones 1994).

Fisher home ranges are characterized by a mosaic of forest types and seral stages, including high proportions of mid to late-seral stands (42 percent to 72 percent of a home range) as well as lower proportions of open or non-forested stands (Raley et al. 2012). Based on a synthesis of recent research on fisher in western North America, Raley et al. (2012) contend that when establishing their home ranges, fishers benefit from inclusion of a variety of forest conditions. This increases their access to a diversity and abundance of prey species that use different forest conditions, while at the same time providing the habitat features the fishers themselves need for reproduction and thermoregulation.

Large-diameter snags and logs are used for denning, resting and foraging, and the structure of habitat (i.e., complex vertical and horizontal structure with larger live trees, snags and logs) is more important to fisher than any particular forest types (Raley et al. 2012). Fishers are more selective of habitat for resting sites than of habitat for foraging, demonstrating that resting sites are of particular importance (Ruggiero et al. 1994). In northern Idaho canopy cover is not considered to be a limiting factor (Schwartz et al. 2013); and Sauder and Rachlow (2014) report that the amount and configuration of contiguous mature forest strongly influenced habitat use by fishers. In Idaho, Jones (1991) found fishers avoided openings and forested areas with 40% or less canopy closure. The amount of openings (defined as areas with <10% conifer canopy cover) may also be a limiting factor in determining home range suitability. Although fisher may hunt along the edges of openings, they are reluctant to cross large openings; and there is likely some point at which an increasing percentage of openings degrades the home range quality enough that fishers would no longer select it. Sauder and Rachlow, (2014) found the average fisher home range contained 5% or less openings. Forests within or adjacent to riparian areas are particularly important to fishers (Heinemeyer and Jones 1994). In his study in north-central Idaho, Jones (1991) found that during the summer fishers generally preferred grand fir and spruce forests and avoided dry ponderosa pine and Douglas-fir habitats. However, in winter, fishers also selected stands with relatively high basal areas of Douglas-fir and lodgepole pine.

Affected Environment

Fishers historically occupied much of the forested habitats in the northern United States (Heinemeyer and Jones 1994). Populations declined in the early 20th century, due mainly to over-trapping and poisoning. Habitat loss as a result of human settlement in low-lying areas likely contributed to population declines as well (USDI Fish and Wildlife Service 2011). In the western United States, fishers have remained at low numbers or absent from portions of their former range (Heinemeyer and Jones 1994). Population trend

information for fishers in northern Idaho is unavailable but based on sighting information, fishers are currently uncommon. However, the status and distribution of the historic (pre-settlement) fisher population is equally unknown, and populations were likely never as abundant as in the east. The absence of historic population estimates, along with a lack of current numbers or trends, do not allow for a comparison of the impacts of landscape-scale changes on fisher populations (USDI Fish and Wildlife Service 2011).

Changes to forest structure due to natural and human-caused disturbances (such as fire or timber harvesting) can negatively impact habitat for fisher, particularly when they affect late seral mesic forest types and forested riparian areas. Past logging activities, including salvaging of occasional large stems, likely deteriorated fisher habitat by removing forest canopy, snags and current and future dead and down material. Most studies have found fishers tolerant of moderate degrees of human activity including roads, although Heinemeyer and Jones (1994) hypothesized that roads may indirectly lead to increased trapper access. Fisher cannot be legally trapped in Idaho but are occasionally caught in sets intended for other species (such as marten and bobcat).

Modeled fisher habitat mapped in 2008 indicates there are 1,193,893 acres of winter habitat and 520,415 acres of summer habitat on the Idaho Panhandle National Forests (IPNF) (Samson 2006a, updated by Bush and Lundberg 2008). Samson (2006a) estimated that the Total/Regional minimum viable population habitat threshold for fisher is 100,078 acres. Based on this number and the 2008 model, fisher habitat on the IPNF appears well above the minimum viable population habitat threshold for this species.

The majority of habitat within the project area consists of shade tolerant conifer mixes including grand-fir, grand-fir/shade tolerant conifer mix, and Douglas-fir/shade intolerant conifer mix. About 76% of the project area are in the Warm/Moist biophysical setting. Approximately 78% of the project area is considered capable fisher habitat based on the habitat types they are shown in the literature to use. For this analysis, the Honey Badger Project area is used as the analysis area because it is large enough to accommodate a home range for a fisher considering the median home range of a female fisher is approximately 10,131 acres and for a male 20,510 acres (Jones 1991). The project area could potentially accommodate up to 3 female fishers. Based on Sauder's 2014 research, existing habitat conditions within the Honey Badger Project area would be suitable for selection as a home range. The project area currently has well over 50% mature forest arranged in connected, complex shapes with less than 5% openings (Wildlife Project File W-013).

Approximately 32,800 acres of the 42,132-acre analysis area are considered capable fisher habitat. About 40% of the Honey Badger Project area is in large, interconnected expanses of mature or late successional forest suitable for denning and dating back at least to the time from 1914-1920. Currently, about 68% (28,451 acres) of the analysis area is comprised of forest stands more than 60 years old, some of which are acres of retained as existing and recruitment old growth.

The Honey Badger Project area has a relatively high density of streams (perennial and intermittent) that would receive some level of protection from harvest activities. Jones and Garton (1994) found that fishers preferred forested riparian areas for resting sites and used them extensively for traveling (Jones 1991). In addition, Jones and Garton (1994) indicated that forested riparian areas likely provide optimal habitat for two preferred prey, snowshoe hare and southern red-backed voles and therefore, would likely make excellent corridors to connect preferred habitats.

Population status and trend

Fisher distribution is thought to be similar to historic levels in the northern Rocky Mountains (USDI Fish and Wildlife Service 2011), while western populations remain at low levels. In Idaho, in the Panhandle

Region fishers are found in the Selkirk Mountains, West Cabinet Mountains in the north, the Clearwater and Salmon River Mountains in central Idaho, and the Bitterroot Range, including the Selway-Bitterroot Wilderness, in the north-central portion of the state. The Lochsa River area of Idaho appears to have some of the highest fisher densities in the region, with approximately 1 fisher per 24,000 acres (Schwartz 2010, unpublished data, as cited in USDI Fish and Wildlife Service 2011a).

Observations and Surveys

In an Idaho Fish and Game (IDFG) Panhandle Region Multi-Species Baseline Initiative Project (Lucid et al. 2016), 46 individual fishers were detected on the IPNF and found to be more abundant in the West Cabinet Mountains compared to other locations on the IPNF. Additionally, surveys conducted during 2018 in three different locations within the project area failed to detect fisher (Wildlife Project Files W-014, W-015, W-016). Fisher presence has not been documented within or near the Honey Badger Project area.

Environmental Consequences – Fisher

Methodology

Fisher habitat was evaluated based on habitat requirements documented in published literature and discussion follows of possible project effects at multiple spatial scales. Fine scale habitat analysis addresses potential denning/resting sites and the stands that support them. These areas are important because they are thought to be critical for fisher reproduction and survival (Raley et al. 2012). Larger scale analysis (home range or landscape) may be a better predictor of fisher presence and is more appropriate for assessing effects of forest management (Sauder and Rachlow 2014).

Denning/Resting

Proposed harvest units were assessed based on their ability to provide denning or resting sites for fishers. The concept of "capable" habitat is used here to identify those stands that could, at some point in time, provide these features, and included the majority of the forested stands in the Honey Badger Project area. Areas of capable habitat that appeared to contain the attributes selected by fishers for denning or resting sites were considered "suitable" denning/resting habitat if the vegetation databases met the habitat components. Suitable habitat components were defined as capable forested stands with canopy closure greater than 40 percent, all forest types except ponderosa pine, and average stem diameter in the primary overstory layer greater than 15 inches diameter at breast height (DBH). Snag per acre data was limited in the project area, therefore we assumed that there are on average 2.6 snags/acre ≥ 20 inches DBH in mid-seral forests and 5.1 snags/acre ≥ 20 inches DBH in Late-seral forests within the Honey Badger Project area (Bollenbacher et al. 2009, Table 12).

Canopy closure of greater than 40 percent is based on Jones' (1991) finding that fishers in his study area preferred stands with canopy cover greater than 60 percent, avoided stands with canopy cover less than or equal to 40 percent, and used stands with 41 to 60 percent canopy cover in proportion to availability when selecting resting sites. The use of 15 inches or greater average diameter in the primary overstory layer is a proxy for what Jones (1991) described as "mature forest" and "old-growth" stands in his study area (size classes that were not avoided by his study animals selecting resting sites). Jones (1991) found most resting sites to be in the canopies of live trees, but large snags and down logs were preferred as maternal dens.

Using information from the Forest Service vegetation databases (FSVeg and R1 VMap (2017)) areas proposed for treatment were reviewed to determine if they contained the habitat parameters

necessary to be considered potentially suitable for denning/resting. Project effects were determined by predicting the change in habitat suitability that would result from alternative 2.

Landscape/Homerange

Recent research has focused on habitat analysis at larger scales (landscape or individual fisher home ranges) as predictors of fisher occurrence (Raley et al. 2012, Sauder and Rachlow 2014, 2015). Raley et al. (2012) report fisher home ranges containing relatively high proportions of mid- and late-seral forest (42 to 72 percent). Sauder and Rachlow (2014) found that landscapes that had ≥ 50% mature forest arranged in connected, complex shapes with few isolated patches, and open areas comprising ≤ 5% of the landscape characterized a forest pattern selected by fisher. Sauder and Rachlow (2014) predicted that an increase in the amount of open area on the landscape from 5 to 10 percent would reduce the relative probability of occupation by fishers by 39 percent. However, they also report that the configuration (sizes and distance between) mature forest patches was the most important habitat variable to predict fisher occurrence.

Raley et al. 2012 define "mid-seral" according to Zielinski et al. 2004 as "early mature, early mature-with pre-dominants, early mature-harvest with pre-dominants and early mature-harvest types." For the Honey Badger Project analysis, mid- to late-seral forest was considered to be any forest stand more than 60 years old. Stands of this age also likely meet the Sauder and Rachlow definition of "mature forest" (i.e., trees of 25-50-meter canopy height) in the project area. The Honey Badger Project analysis used the FSVeg and VMap (2017) databases to estimate the amount and distribution of mature forest in the project area both before and after project implementation under both alternatives. The analysis did not attempt to duplicate the Sauder and Rachlow (2014) proximity index approach, instead merely mapping forest cover pre- and post-implementation to assess project effects on mature forest configuration.

To evaluate the amount of open area in the Honey Badger Project area both before and after project implementation under both alternatives (using Sauder and Rachlow's 2014 definition of "open areas" as those with canopy cover less than 10 percent), the analysis employed FSVeg and VMap (2017) databases as well as aerial photo reviews.

Alternative 1 – (No Action)

Under alternative 1 no active management would occur within fisher habitat including riparian and old growth habitat. Alternative 1 would provisionally preserve currently suitable denning habitat for fisher within the Honey Badger Project area and would bring some stands into suitable denning condition more rapidly than treatment would in the absence of large disturbances. These stands would be more vulnerable to insect infestations and disease, which could be beneficial to fisher in the short-term by providing snags and structures for resting. With continued fire suppression and lack of active management, the indirect effects of this alternative would include a continued trend towards uncharacteristic vegetative conditions, lower resistance to insect and disease, and increased potential for severe fire behavior within the project area. Severely burned-over areas could take up to 100 years to once again provide denning habitat. While alternative 1 would provide better habitat than alternative 2 in the near future because it retains existing mature forest, this habitat is not expected to persist over time. Sauder and Rachlow (2015) found that fishers select core use areas within home ranges based on habitat heterogeneity and diversity. Alternative 1 would rely on natural mechanisms to promote habitat heterogeneity which may or may not occur at appropriate frequencies and/or extents. Habitat modeling conducted for the 2015 revised Forest Plan determined that habitat would slowly decrease over the next five decades in

the absence of activity, largely as a result of wildfire and root disease (USDA Forest Service 2013).

Alternatives 2 - Direct and Indirect Effects

Denning/Resting Habitat

The action alternative proposes timber harvest on approximately 10,876 acres of capable fisher habitat. This includes about 4,968 acres of clearcut with reserves, 4,135 acres of shelterwood harvest, 1,462 acres of seedtree harvest and 311 acres of commercial thinning. Proposed regeneration harvest includes up to 2,912 acres in stands that provide potentially suitable fisher denning/resting habitat (clearcut with reserves shelterwood and seedtree harvests). Regeneration harvest would revert habitat to an earlier successional stage where it would no longer be considered potentially suitable for denning or resting. This would reduce potentially suitable denning/resting habitat in the project area by approximately 50% (from 5858 acres to 2946 acres) following treatment prescriptions.

We are not aware of any published habitat recommendations, or "thresholds" for the amount of denning/resting habitat required per home range by individual fishers. While it may be desirable to have a number of alternate sites for resting (or for maternal dens) in case the preferred site is altered or disturbed, it would seem counterproductive to have an entire home range consisting of this habitat. Stands that meet this description (older, somewhat decadent forest) usually contain less diversity and quantity of prey species. Recent studies (Raley et al 2012, Sauder and Rachlow 2014, 2015) agree that habitat heterogeneity and diversity is important to fishers (see "Landscape/Homerange" discussion, below). Given that fishers are low-density carnivores with relatively large home ranges, it would seem advantageous to have clusters of denning/resting habitat distributed throughout the home range, rather than large amounts concentrated in only a portion of a home range.

Regeneration harvest of stands that are not currently suitable denning/resting habitat would similarly set them back to an earlier successional stage that would probably require between 50 and 100 years (depending upon how many residual green trees remain after harvest) to reach suitable condition. Some stands may reach suitable condition more rapidly if left untreated (see "Alternative 1" discussion, above). However, treated stands would have considerably higher proportions of long-lived seral species, and subsequently would remain in suitable condition (once attained) for a longer period of time as they would be more resistant to insects and disease, weather events and fire.

Landscape/Homerange Analysis

Approximately 9,589 acres of capable mature (more than 60 years old) forest are within proposed timber harvest units, including 4,266 acres of clearcuts with reserves, 3,753 acres of shelterwood harvest, 1,337 acres of seedtree harvest and 193 acres of commercial thinning. This would reduce the amount of capable mature forest in the project area to about 18,862 acres (45%). This figure is within the Raley et al. (2012) recommendation for the amount of mature forest in a home range (42 to 72 percent).

Alternative 2 would create some large areas (>40 acres) of less than 60-year-old forest within each hypothetical fisher home range, which would further fragment some of the existing blocks of mature habitat. However, the majority of the mature habitat blocks would remain interconnected by foraging habitat. Large openings (greater than 40 acres) proposed in alternative 2 resulting in loss of canopy cover would fragment fisher habitat, decrease connectivity among potentially suitable habitat patches, and may cause fisher to expend energy to circumvent openings. It is likely that timber harvest has supplemented natural disturbance regimes (such as fire and windthrow) by providing some level of heterogeneity across the landscape, and, similar to historic fire regimes, the negative effects of large

canopy openings, even at the scale proposed in this project, are temporary. The long-term benefits to fisher in treating large areas include providing larger, less fragmented patches in the future that are more resistant to natural disturbance that will remain on the landscape for longer periods of time. Loss of canopy cover due to fire could result in fisher not using parts of former home ranges or limit fisher movement the landscape (USDI Fish and Wildlife Service 2017). However, the larger the openings, the more effective treatment areas are for suppression, therefore decreasing the potential for extreme fire behavior that could potentially convert even larger areas into unsuitable fisher habitat.

Timber harvest also has the potential to increase the amount of open area in the Honey Badger area, although predicting the actual extent is problematic. Sauder and Rachlow (2014) narrowly define open areas as having less than 10% canopy cover, which is the middle of the range of expected residual canopy cover (5-15%) of seedtree units. The Honey Badger Project predicts a residual 10% or greater canopy cover for some seedtree units, however, to be conservative, we have assumed that approximately one-half of acres harvested in seedtree units are reduced to less than 10% canopy cover. Postharvest condition of all shelterwood units would remain at or above 10% while clearcuts with reserves would be below 10%, under this definition based on discussions with the project silviculturist. Assuming that approximately one-half of acres harvested in seedtree units are reduced to less than 10% canopy cover, the proposal would result in an approximately 3,410-acre increase (8%) in open areas (about 831 acres of seedtree harvest plus 2,579 acres of clearcut with reserves).

Sauder and Rachlow (2014) suggest that managing for less than 5 percent open areas could serve as a target for managers seeking to maximize fisher occupation. It is unclear how this recommendation is to be applied to management activities since natural openings often comprise more than five percent of landscapes. Additionally, this would seem to be in conflict with the Revised Forest Plan Desired Conditions that call for "a range of patch sizes that have a diversity of successional stages" and an increase in size of forest patches dominated by seedling/sapling and large size classes, and associated decrease in size of patches with small and medium-sized trees (FW-DC-VEG-05).

However, Sauder and Rachlow (2014) seem to imply that a diversity of habitat in home ranges may (at some level) be more important to fishers than amount of open area, stating that "having a variety of habitat patches within a matrix of well-connected mature forest was a forest pattern favored by fishers." This is also supported by the Raley et al. (2012) recommendation for 42 to 72 percent of mid- or late-seral forest (implying up to 48 percent of another type), and Sauder and Rachlow (2015) reporting core use areas containing "moderate" amounts of high canopy cover forest. All of these research articles generally support the supposition that habitat heterogeneity and diversity is important to fishers. The Honey Badger Project would increase diversity (in structure and composition) of forest stands while maintaining connectivity of mature forest patches, despite the increase in open areas.

Other Project Activities

The project proposes approximately 311 acres of pre-commercial thinning/pruning of capable habitat within the analysis area. Thinning young, small diameter trees would be designed to increase the overall health and vigor of the stands. This has the potential to temporarily reduce densities of prey species such as snowshoe hares but is designed to produce stands with lower densities of large diameter trees that would potentially create improved fisher denning habitat when they fully mature.

Temporary roads and closed roads reconstructed for project purposes would not be available for public use and would be either obliterated (temporary roads) or closed following project implementation. Newly constructed permanent roads added to the system will be closed to the public year-long to all motorized uses, including motorized winter recreation. These roads would only receive periodic administrative use.

Since there would be no consequential change to the open road system there would be no change in vulnerability to trapping.

Work occurring in potential fisher travel corridors, like trails and riparian areas, could cause temporarily disturbance to this species. However, project components such as trail system maintenance and improvement, culvert replacement and stream channel restoration would benefit fisher habitat in the long term by reducing erosion adjacent to streams and concentrating recreational activity to specific areas.

Post-harvest fuels treatments (burning and piling) would have relatively minor effects on fishers. The species is not particularly sensitive to disturbance, and regenerated units are unlikely to be extensively used by fishers following harvest. Both burning and grapple piling would reduce availability of coarse woody debris, but these stands would not be used for denning for a number of years after harvest due to inadequate canopy cover. Additionally, approximately one slash pile per 5 acres would be left in piled units, when possible, to provide habitat for snowshoe hares and other small mammals fishers prey upon. Sullivan et al. (2012) report significant increases in diversity and abundance of small mammals associated with woody debris arranged in large piles on harvested sites.

The effects to fishers from proposed burning in the project area are difficult to predict, but are unlikely to impact the species in substantial ways:

• Stands providing potential denning/resting habitat would not be targeted for burning and are unlikely to burn with high severity (these stands provide relatively more shade and moisture than surrounding areas) if fire were to enter them.

• Effects to low- to medium-elevation mesic forests and riparian areas (preferred fisher habitat) are expected to be minimal.

• Although the intent of much of the proposed burning is to increase the size of existing openings and occasionally create new openings within areas of homogenous forest, most of the affected areas would be smaller-diameter trees encroaching on historic openings, or dense stands with depauperate understories that provide limited foraging (and poor denning/resting) habitat for fishers. While these enlarged or newly created openings may hinder fisher travel somewhat, the habitat effects would be minor.

• Fishers are not particularly sensitive to human disturbance and would be expected to merely move away from affected sites during burning operations.

• Finally, proposed burning is designed to diversify habitats compared to the existing condition. This should result in increased populations of small mammals and other items that fisher prey upon.

Approximately 33 miles of new permanent road construction is proposed to assist in project implementation that would remove capable fisher denning habitat. Given the typical vegetation clearances recommended for permanent roads, this equates to about 3 acres per mile. Therefore approximately 99 acres of potential denning habitat would be permanently lost due to the addition of permanent system roads. All new permanent roads will be put in storage and will not be open to the public.

Cumulative Effects

The following past, ongoing and reasonably foreseeable actions were considered in a cumulative effects discussion for fisher:

Public Activities – Personal-use firewood gathering is anticipated to continue along seasonally and yearlong open roads, potentially reducing snags within 200 feet of such roads. Although it is unlikely to disrupt normal fisher use patterns, firewood cutting can deteriorate habitat in these roadside areas by removing large snags that represent future dead and down wood denning opportunities. Various recreation activities are unlikely to impact fishers, with the exception of over snow motorized vehicle travel that can provide access for trappers. The effects of over snow motorized vehicle use, as well as trapping itself, are characterized by the analysis of changes in motorized route miles. This proposal would not increase over-snow motorized vehicle use above current levels. Therefore, the risk of trapping mortality would not increase as a result of this proposal. Other public recreation activities are unlikely to impact fishers.

Fire Suppression – Fire suppression activities are generally good for fisher habitat in the short-term (5-10 years), as they protect denning habitat from stand-replacing fire and contribute to understory congestion in dry-site stands that provide cover for small mammals that fishers prey upon. However, this activity can also slow the development of quality late-successional habitat where it does not currently exist by encouraging growth of higher densities of smaller-diameter shade-tolerant species and contributing to higher incidences of insects and disease, and subsequently resulting in fuel loading that may cause larger, hotter future wildfires. As a result, fire suppression may benefit this species in the short term by helping preserve mature forest cover, although the longer-term effect may ultimately be a deterioration of habitat quality and quantity.

Scientific Uncertainty and Opposing Science

The effects of timber harvest on fisher populations over multiple spatial and temporal scales is an interesting question. Research has unequivocally demonstrated that, at the local scale, logging can negatively impact habitat for fisher, particularly when it affects late seral mesic forest types and forested riparian areas (see, for example, Ruggiero et al. 1994). Timber harvest can reduce forest canopy, remove snags, and diminish current and future dead and down material. Although fisher may use previously harvested stands for foraging and denning/resting sites, unharvested stands are preferred for denning.

Even so, while most fisher habitat (both current and historic) in the western United States is under Forest Service management, it has been suggested that timber harvest on National Forest System lands in the Northern Rockies is unlikely to have contributed to fisher population declines in any considerable way. The U.S. Fish and Wildlife Service has noted that fisher populations declined precipitously in the 1920s, but the balance of forested habitat (outside of dry-forest types) in Idaho and Montana showed little or no logging activity before 1940 (USDI Fish and Wildlife Service 2011). This document goes on to state that "Fishers were so rare as to be considered extirpated before large-scale [timber] harvesting occurred" in the region.

Management actions in the Forest Service Northern Region in general, and the IPNF in particular, have been criticized for perceived reductions of fisher habitat and failure to properly account for the effects of these reductions (both past and present) on fisher populations (Center for Biological Diversity et al. 2013, Shultz 2012). However, the following information does not support these arguments:

• In a petition to list the Northern Rocky Mountain Range DPS of fisher under the ESA, the Center for Biological Diversity and others (2013) cited timber harvest and forest management as a current threat to fisher survival, pointing out that a total of more than 626 million board feet of timber were removed from seven National forests between 2009 and 2012. While this figure seems high, when placed in context logging actually impacts relatively small portions of the affected forests. Across the entire Northern Region of the U.S. Forest Service (R1), 12,662 acres of about 223,512,200 acres (0.0056 percent of the forested landscape) were subject to timber harvest in 2012. On the IPNF, timber harvest affected about 1,645 of 2,470,384 forested acres (0.067 percent). For the 10 year period from 2003-2012, total timber

harvest was 165,006 acres in R1 (0.074 percent), and 23,329 acres on the IPNF (0.94 percent).[1] More recent reports show that timber harvest has increased somewhat since 2012, but still comprises a fraction of the land base at both scales.

• Additionally, the average annual timber harvest on the IPNF from 2009-2012 (about 23 million board feet) equates to less than 6 percent of the approximately 405 million board feet the forest is estimated to grow each year. At this rate of harvest, it would take the IPNF nearly 17 years to harvest a single year's growth. It is likely that fisher resting/denning habitat is being created on the forest at a much greater rate than it is being lost through timber harvest.

• The IPNF has not conducted timber harvest or other management that removed allocated old growth stands for more than 20 years (and the amount of old growth lost through wildfire or other natural disturbances has been minimal) (USDA Forest Service 2010), and the 2015 Revised Forest Plan prohibits loss of old growth through management activities. Also, recent timber harvest on the forest has placed an increased emphasis on harvest of small-diameter and late-seral tree species. It is reasonable to assume that, across the larger landscape, fisher is not threatened by habitat modification resulting from timber harvest on the IPNF.

• Schultz (2010) states that "Without any thresholds to provide some context for projects that eliminate small portions of [fisher] habitat, there is no clear basis for asserting there are no significant cumulative effects." However, based on discussion above, localized project effects are essentially being negated at larger spatial and temporal scales, so the case for inconsequential cumulative effects can be made even in the absence of habitat thresholds (if they existed).

• As discussed above, it is unknown if any thresholds for the amount of denning-resting habitat required per home range by individual fishers exist (i.e., how much is enough?). Similarly, while Raley et al. (2012) and Sauder and Rachlow (2014) provide suggestions for individual home ranges, the larger question remains unanswered: how many such home ranges are required for the species to persist? Based on historic estimates ("HRV" – see USDA Forest Service 2013), it is highly unlikely that the entire landscape met the Sauder and Rachlow (2014) "5 percent opening" condition at any time, yet fisher were present prior to western settlement. Apparently, some (currently unknown) proportion of the landscape is required in acceptable home ranges to maintain populations. While the validity of a Northern Region-sponsored viability analysis (Samson 2006a, 2006b) has repeatedly been questioned (see Schultz 2010), no other scientifically sound, quantitative minimum viable population determinations for the various species studied – independent or otherwise – has been produced that would supplant this assessment. The analysis provides credible evidence that viability is being maintained in the Northern Region (see "Conclusion").

Regarding fisher population trends, the U.S. Fish and Wildlife Service (2011) stresses that historic population estimates and current estimates and trends are generally lacking in the region, and attempting to perform population estimates on a secretive, solitary, and low-density carnivore at the project (or even Forest) level would be of limited value. In fact, even the comprehensive sampling undertaken by Lucid et al. (2016) represents but a piece of the larger picture (essentially a snapshot in time that could provide a baseline for long-term monitoring).

[1] http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5403648.pdf

Conclusion

The Honey Badger project area has a somewhat fragmented pattern of mature capable habitat, although the amount of mature habitat meets recommended levels reported in the literature (Sauder and Rachlow, 2014, Raley et al. 2012). It is unclear therefore, at the landscape scale, given the existing configuration of mature habitat patches and amount of open areas, if fishers would inhabit the hypothetical fisher home ranges that encompass the Honey Badger Project area.

The Honey Badger Project would regenerate up to 975 acres in stands that provide potentially suitable fisher denning/resting habitat. Alternative 2 would also harvest approximately 9,589 acres of mature (more than 60 years old) capable forest in the Honey Badger Project area. This equates to a 23% change (from 63%t to 45%) in a mature (60+ year old) capable forest following project implementation but still remains within the recommended range within the literature. The project would also increase open areas in the Honey Badger Restoration Project area by 8%. However, this would also add to the diversity of habitats within these home ranges, consistent with research that calls for heterogeneity of fisher habitat.

Other project activities (precommercial thinning, road reconstruction and storage, stream crossing restoration and various recreational developments) would have minor effects to fishers since they would have small (if any) effects to important habitat components and the species is not particularly sensitive to human disturbance.

While fishers are not old growth obligates, they associate with late-seral forest characteristics (Sauder and Rachlow 2015). Large-diameter snags are also used almost exclusively for maternal den sites. Analysis of forest inventory and analysis data reveals an average of 1.4 snags per acre greater than 20 inches DBH across the Central Zone of the Idaho Panhandle National Forests (1.0-2.0 snags per acre at 90% confidence intervals; USDA Forest Service 2010). Also, there is currently an estimated 11.8 percent of forested lands allocated as old growth on the Idaho Panhandle National Forests, and 9.2 percent of the Coeur d'Alene geographic area (USDA Forest Service 2010). Based on these estimates, old growth and large snag presence is being maintained on the Forests.

Despite a general direction on the Idaho Panhandle National Forests to restore long-lived early seral species, there has also been an effort to preserve old-growth stands, allow natural succession in riparian areas (potentially suitable habitat and important travel corridors), and preserve and recruit large woody debris forest wide. Riparian areas would remain intact through implementation of the Inland Native Fish Strategy and reduced activities within riparian habitat conservation areas, and no reductions in allocated old growth would result from this action. While management actions may impact fisher habitat at a localized scale, this would have inconsequential effects relative to natural changes expected to take place over the coming decades. Instead, wildfire, insects/disease, in-growth, and stand succession will largely determine the amount and pattern of fisher habitat on the Forest in the future (USDA Forest Service 2013).

Bush and Lundberg (2008) estimated that the Idaho Panhandle National Forests contains approximately 520,400 acres (2,106 km2) of fisher summer habitat and approximately 1,193,760 acres (4,831 km2) of fisher winter habitat. Samson (2006b), citing Smallwood (1999), asserts that the threshold habitat level to maintain a viable fisher population is about 100,077 acres (405 km2), or about one-fifth of the available habitat on the Forests. Given this information, the change to fisher habitat under alternatives 2 is unlikely to result in a loss of viability of this species. As a result, adequate habitat to maintain viable fisher populations would remain on the Idaho Panhandle National Forests after project implementation. The U.S. Fish and Wildlife Service (2011) determined that "the best commercial and scientific information

available does not indicate that current or future forest management practices and timber harvest threaten the fisher now, or in the foreseeable future."

Consequently, alternative 2, in conjunction with the past, present and reasonably foreseeable actions may impact fisher or their habitat but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

Consistency with the Forest Plan

There are no Revised Forest Plan standards or guidelines specific to fisher. Instead, it is indirectly addressed in the Revised Plan through desired condition FW-DC-VEG-01, FW-DC-VEG-02, FW-DC-VEG-03 and FW-DC-VEG-11 (improve habitat by restoring species structure and composition to more closely reflect HRV); desired condition FW-DC-VEG-07 and guideline FW-GDL-VEG-04 (snag presence); and desired condition FW-DC-WL-12 through 14 (maintenance of old growth, snags and down wood). All action alternatives are consistent with Forest Plan direction, although alternative 1 does little to restore habitat or encourage development of large-diameter snags.

LIST OF REFERENCES CITED

Bollenbacher, B. R. Bush, and R. Lundberg, 2009. Estimates of Snag Densities For Northern Idaho Forests in the Northern Region. Report 09-06 V1.3.

Bush, R., & Lundberg, R. (2008). Wildlife habitat estimate updates for the Region One conservation assessment. Retrieved from Missoula, MT: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5130739.pdf

Center for Biological Diversity and others. 2013. Petition to list the Northern Rockies Distinct Population Segment of Fisher (Pekania pennanti) as Threatened or Endangered under the Endangered Species Act. Submitted to USDA Fish and Wildlife Service on September 23, 2013.

Clark, L.R. and R.N. Sampson. 1995. Forest ecosystem health in the inland west: A Science and Policy Reader. Forest Policy Center, Washington D.C. 37 p.

Engle, J.C., and C.E. Harris. 2001. Idaho species of special concern element state rankings reviews. Non-game and endangered wildlife program, Conservation Data Center, Idaho Department of Fish and Game, Boise, Idaho. 104 p.

Heinemeyer, K.S. and J.L. Jones. 1994. Fisher biology and management: a literature review and adaptive management strategy. USDA Forest Service Northern Region, Missoula, MT. 108 p.

Jones, J.L. 1991. Habitat use of fisher in north central Idaho. M.S. thesis, University of Idaho, Moscow, Idaho. 147 p.

Jones, J.L. and E.O. Garton. 1994. Selection of Successional Stages by Fishers in North-Central Idaho. In: Martens, Sables, and Fishers, Biology and Conservation. Edited by S.W. Buskirk, AS. Harestad, M.G. Raphael, and R.A. Powell.

Lucid, M.K., L. Robinson, and S.E. Ehlers. 2016. Multi-species Baseline Initiative project report. 2010-2014. Chapter 4 – Carnivores. Idaho Dept. of Fish & Game, Coeur d'Alene, ID USA. 56 p.

Powell, R.A. and W.J. Zielinski. 1994. Fisher. Pages 38-73 in L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, and W.J. Zielinski, editors. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical report RM-254, Fort Collins, Colorado, USA.

Raley, C.M., E.C. Lofroth, R.L. Truex, J.S. Yaeger, and J.M. Higley. 2012. Habitat ecology of fishers in Western North America. Chapter 10 in Aubry, K.B., W.J. Zielinski, M.G. Raphael, G. Proulx, and S.W. Buskirk (eds.). Biology and Conservation of Martens, Sables, and Fishers – a new synthesis. Cornell University Press, Ithaca, NY. P. 231-254.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, L.J. Lyon, and W.J. Zielinski (tech. eds.). 1994. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. Gen. Tech. Rep. RM-GTR-254. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Ft. Collins CO. 184 p.

Samson, F.B. 2006a. A Conservation assessment of the northern goshawk, black-backed woodpecker, flammulated owl, and pileated woodpecker in the Northern Region, USDA Forest Service. Unpublished report on file, Northern Region, Missoula, Montana. 160 pp.

Samson, F.B. 2006b. Habitat Estimates for Maintaining Viable Populations of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, Pileated Woodpecker, American Marten, and Fisher. Unpublished report on file, Northern Region, Missoula, Montana. 24 pp.

Sauder, J.D. and Rachlow, J.L. 2014. Both forest composition and configuration influence landscape-scale habitat selection by fishers (Pekania pennanti) in mixed coniferous forests of the Northern Rocky Mountains. Forest Ecology and Management 314:75-84.

Sauder, J.D., and J.L. Rachlow. 2015. Forest heterogeneity influences habitat selection by fishers (Pekania pennanti) within home ranges. Forest Ecology and Management 347:49-56.

Schwartz, M.K., DeCesare, N.J., Jimenez, B.S., Copeland, J.P., & Melquist, W.E. 2013. Stand-and landscape-scale selection of large trees by fishers in the Rocky Mountains of Montana and Idaho. Forest Ecology and Management 305:103-111.

Schultz, C.A. 2010. Challenges in Connecting Cumulative Effects Analysis to Effective Wildlife Conservation Planning. American Institute of Biological Sciences.

Spencer, W.D., H. Rustigian-Romsos, J. Strittholt, R.M. Scheller, W. Zielinski and R. Truex. 2011. Using occupancy and population models to assess habitat conservation opportunities for an isolated carnivore population. Biological Conservation. 144:78-803.

Sullivan, T.P., D.S. Sullivan, P.M.F. Lindgren and D.B. Ransome. 2012. If we build habitat, will they come? Woody debris structures and conservation of forest mammals. Journal of Mammalogy 93(6):1456-1468.

USDA Forest Service. 2010. Idaho Panhandle National Forests Forest Plan Monitoring Reports 2007, 20008 and 2009. Supervisor's Office. Coeur d'Alene, ID. 150 pp.

USDA Forest Service. 2011. Region One Sensitive Species List – Wildlife (Final). 5 p.

USDA Forest Service. 2013. Final Environmental Impact Statement for the Revised Land Management Plan. Idaho Panhandle National Forests. Coeur d'Alene, ID. 715 p.

USDA Forest Service. 2015. Idaho Panhandle National Forests Land Management Plan 2015 Revision. Coeur d'Alene, Idaho. 187 p.

USDI Fish and Wildlife Service. 2017. Species status assessment report for the Northern Rocky Mountains, Fisher. Version 2.0. 83 pp.

USDI Fish and Wildlife Service. 2011. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List a Distinct Population Segment of the Fisher in its United States Northern Rocky Mountain Range as Endangered or Threatened with Critical Habitat. 50 CFR Part 17. Bol. 76, No. 126: p. 38504-38532.

Weir, R.D. and F.B. Corbould. 2010. Factors affecting landscape occupancy by fishers in north-central British Columbia. J. Wildl. Manage. 74 (3), 405-410.

Wisdom, M.J., R.S. Holthausen, B.C. Wales, C.D. Hargis, V.A. Saab, D.C. Lee, W.J. Hann, T.D. Rich, M.M. Rowland, W.J. Murphy and M.R. Eames. 2000. Source habitats for terrestrial vertebrates in the interior Columbia Basin: Broad-scale Trends and Management Implications. Vols. 1-3. General Technical Report PNW-GTR-485. USDA Forest Service, Pacific Northwest Research Station. Portland, Oregon. 529 p.

Zielinski, W.J., R.L. Truex, G.A. Schmidt, F.V. Schlexer, K.N. Schmidt, and R.H. Barrett. 2004. Home range characteristics of fisher in California. Journal of Mammalogy 85:649-657.

Zielinski, W.J., J.R. Dunk, J.S. Yaeger and D.W. LaPlante. 2010. Developing and testing a landscape-scale habitat suitability model for fisher (*Martes pennanti*) in forests of interior northern California. Forest Ecology and Management 260:1579-1591.

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